

AP Precalculus  
Implicit Relations and Curves

Implicit Relations and Curves | APPC-U04-P07

96 problems · Four activity formats

|    |                            |              |
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| 01 | Answer Bank Challenge      | 24 tasks     |
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Topic focus

Across 96 tasks this topic asks for consistency judgment, possible entries, member set, invalid row, inequality and rule and restriction, rule, y-domain.

8 PDFs and a README; 104 buyer pages.

## AP Precalculus

# Implicit Relations and Curves

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Exactly one row misses the relation. Which one?

Given: domain:  $x, y$  real; relation:  $(x - 2)(y + 1) = 6$ ; rows:  $(5, 1)$ ;  $(-1, -3)$ ;  $(4, 2)$ ;  $(3, 4)$

Required response

| <b>x</b> | <b>y</b> |
|----------|----------|
| 5        | 1        |
| -1       | -3       |
| 4        | 2        |
| 3        | 4        |

Bank label: \_\_\_\_\_

Identify every coordinate pair that satisfies the scaled relation.

Given: domain:  $x, y$  real; relation:  $\frac{x^2}{4} + \frac{y^2}{9} = 1$ ; rows:  $(0, 3)$ ;  $(2, 0)$ ;  $(1, 2)$ ;  $(\sqrt{2}, 3\frac{\sqrt{2}}{2})$

Required response

| <b>x</b>   | <b>y</b>              |
|------------|-----------------------|
| 0          | 3                     |
| 2          | 0                     |
| 1          | 2                     |
| $\sqrt{2}$ | $3\frac{\sqrt{2}}{2}$ |

Bank label: \_\_\_\_\_

How many rows lie on the relation, and which are they?

Given: domain:  $x, y$  real; relation:  $2x - y = 5$ ; rows:  $(3, 1)$ ;  $(\frac{7}{2}, 2)$ ;  $(\frac{1}{2}, -4)$ ;  $(-1, -7)$

Required response

| <b>x</b>      | <b>y</b> |
|---------------|----------|
| 3             | 1        |
| $\frac{7}{2}$ | 2        |
| $\frac{1}{2}$ | -4       |
| -1            | -7       |

Bank label: \_\_\_\_\_

Mark the valid rows, then explain what they show about  $y$ -values at  $x = 10$ .

Given: domain:  $x, y$  real; relation:  $y^2 = x - 1$ ; rows:  $(x: 10; y: 3)$ ;  $(x: 10; y: -3)$ ;  $(x: 10; y: 0)$

Required response

| <b>x</b> | <b>y</b> |
|----------|----------|
| 10       | 3        |
| 10       | -3       |
| 10       | 0        |

Bank label: \_\_\_\_\_

## AP Precalculus

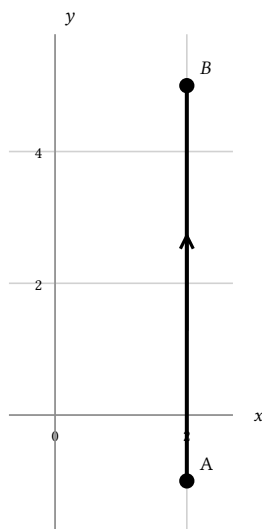
# Implicit Relations and Curves

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Describe both coordinate changes along the arrow.

Given graph



A:  $(2, -1)$

B:  $(2, 5)$



## AP Precalculus

# Implicit Relations and Curves

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Which proposed points belong to the relation?

Given: candidates:  $(5, 3)$ ;  $(5, -3)$ ;  $(5, 1)$ ; domain:  $x, y$  real; relation:  $y^2 = x + 4$

Identify the error or first invalid step, give the corrected result, and state a brief mathematical reason.

| <b>x</b> | <b>y</b> |
|----------|----------|
| 5        | 3        |
| 5        | -3       |
| 5        | 1        |

A student claims: "All four listed rows satisfy  $x^2 - y = 3$ ." Diagnose the first invalid step or assumption, give the corrected conclusion, and justify the correction. Then complete the stated task: Three rows satisfy the relation. Identify the one that does not.

Identify the error or first invalid step, give the corrected result, and state a brief mathematical reason.

| <b>x</b> | <b>y</b> |
|----------|----------|
| -1       | -2       |
| 0        | -3       |
| 2        | 1        |
| 3        | 5        |

## Implicit Relations and Curves

### Full Worked Solutions - excerpt

#### Worked example

**Problem.** Determine whether the relation has any real point above this  $x$ -value.

Given: domain:  $x, y$  real; input  $x: 3$ ; relation:  $(y - 1)^2 = x - 4$

**Answer.** It has none.

#### Explanation and check.

Substitution would make the square  $(y - 1)^2$  equal  $-1$ , impossible over the reals.

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#### Worked example

**Problem.** Give a complete explicit description of the relation.

Given: domain:  $x, y$  real; relation:  $y^2 = (x - 1)^2$

**Answer.**  $y = x - 1$  or  $y = 1 - x$ , for every real  $x$ .

#### Explanation and check.

Equality of the squares means  $y = \pm(x - 1)$ ; the two lines meet at  $(1, 0)$ .